

[ACTIVE DUTY]



U.S. Navy

## Motion sickness takes toll on military ops

BY JEROME GREER CHANDLER

Do you think only the meek get motion sickness? Roman statesman Cicero suffered from it, proclaiming he “would rather be killed” than endure *nausea mara* – sickness from the sea. Camel-riding troops of Napoleon’s ill-conceived Dromedary Corps succumbed to it, debilitated by the rolling gait of their ungainly mounts. Even the legendary Chuck Yeager – the first human to break the sound barrier – threw up on his first airplane ride.

Motion sickness can take a real toll on military operations. “If you’re vomiting, you really aren’t able to do anything else but that,” says Cmdr. Rita Simmons, officer in charge of the Naval Aerospace Medical Research Laboratory (NAMRL) in Pensacola, Fla. “And when you’re finished, you’re pretty much physiologically worn out.”

That’s why there’s a surge to find ways to shut down the malady – so that soldiers, sailors, airmen, Marines and Coast Guardsmen are better able to do their jobs.

First, motion sickness has nothing to do with your stomach. The problem starts with the inner ear, the vestibular system. The Treisman Toxin Theory asserts that when your body perceives irregular motion, it reacts as it would to poison – and tries, quite violently, to get rid of it (“emesis” is the medical term).

Then there’s the Sensory Conflict Theory. Sensory organs tell your body where you are in space, and they record this information, giving the body a baseline set of sensory expectations. If those are rattled by an external force, sensory conflict results. “That’s what starts the cascade of physiologic events,” Simmons says. They include sweating, confusion, accelerated heart rate and incapacitation.

How bad can it get? During D-Day in Europe, a C-47 full of paratroopers had to do a 180 and return to base. That maneuver debilitated even the toughest soldiers; the cabin quickly became awash with “emesis.”

For much of World War II, German submarines crippled Allied shipping in the North Atlantic, but seasickness often crippled the crews. Typically, 30 percent of the crews of merchant vessels and the warships that shepherded them got seasick. If the sea state was really wretched, 100 percent of the crew might succumb.

Motion sickness remains a serious health problem among U.S. servicemembers. After flying strenuous aerobatics, fighter pilots congregate in the officers’ club and debate

whether it’s been a “one- or two-glove” day. Submariners and special-operations troops are also at particular risk – that’s because their vessels are comparatively unstable. Marines get sick during amphibious operations and on the beaches they storm.

Even outside of combat, motion sickness exacts a price. Between 2003 and 2007, it accounted for as much as 16-percent attrition among Navy pilot and navigator trainees. Consider this: the cost to train a Navy pilot is \$160,000, \$115,000 for a navigator.

Scientists have tried lots of remedies for motion sickness. Until recently, none have worked without causing significant side effects. For example, intranasal scopolamine was convenient, fast-acting and terribly imprecise. Researchers found that side effects simply weren’t worth the benefits, Simmons says. Inability to deliver just the right dosage meant blurred vision, increased blood pressure and headaches.

Scientists also tested transdermal patches on NASA astronauts and other subjects. While easy to administer, “absorption time is slow,” a NAMRL review reported, “and side effects associated with ... higher dose(s) and treatment over multiple days can be severe.” Some studies even report hallucinations among the elderly and children.

The solution: stick with intranasal, but make the mixture better – and devise a way to dole out dosages more precisely. In 1996, NASA pharmacologist Lakshmi Putcha developed a new, quick-acting INSCOP formulation. “Scopolamine is the best solution,” Simmons says. “We just needed a formula – and a delivery system.”

Putcha provided the formula, modern technology the delivery system. While 0.8 mg is the typical oral dose for scopolamine, new systems deliver a precise 0.2 mg. As a result, the drug’s side effects all but vanish.

The next phase is field trials and, after that, possible use as a cure for motion-sickness. Simmons believes in “two or three years,” the military will have “a fast-acting, field-expedient countermeasure” for one of the most persistent ailments ever to afflict those headed into harm’s way.

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